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WEEKLY REPORT TO THE COMMISSIONERS
FROM THE EXECUTIVE DIRECTOR
FOR THE PERIOD ENDING
AUGUST 25, 1969

Committees on

Finance and Construction

Wednesday, August 27, 1969

in the

Board Room

at 4:00 P.M.

PLAINTIFF'S EXHIBIT
PX-526

WORLD TRADE CENTER CONSTRUCTION
PROGRESS REPORT

Three strikes affected construction progress at the World Trade Center during the last month. The most serious is a strike by the International Union of Elevator Constructors which began July 1, 1969. Many unsuccessful attempts have been made to mediate a settlement but no agreement is in sight. A strike by the International Brotherhood of Teamsters was settled on Thursday, July 31, after it had delayed all construction operations by cutting off deliveries of materials (see Weekly Report of August 4, 1969). The third strike, by Local 20 of the Sheet Metal Workers, had very little effect on construction before it was settled.

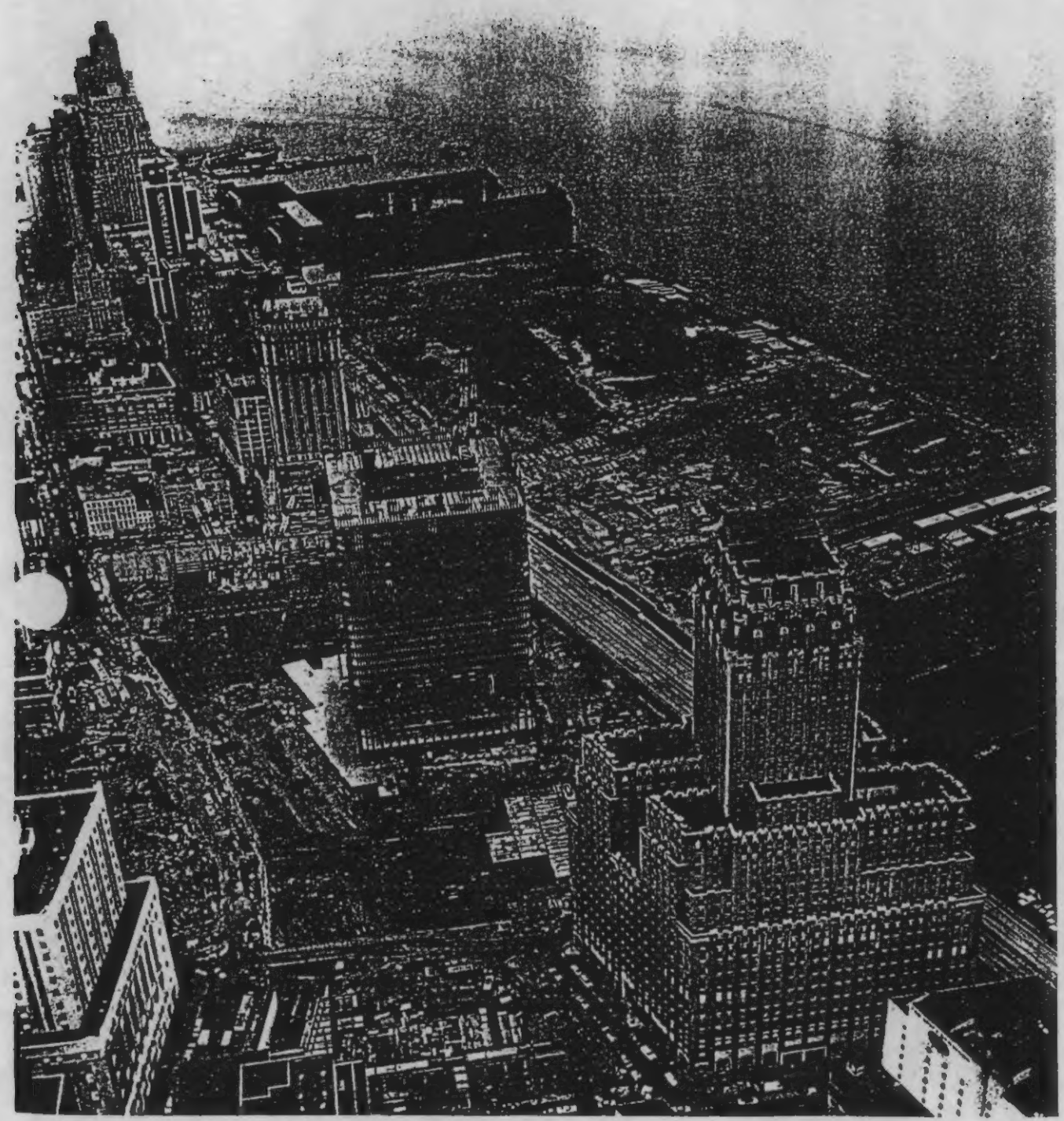
It is our intention to have the effects of the elevator workers' walkout on Trade Center construction fully analyzed after it is ended. At present its greatest effect has been the loss of time by workers who have been forced to climb to their jobs. We have made every effort to ease this burden by sending food and water to them during working hours. However, complaints by the workers have increased and there is a possibility that work will end in some of the higher levels until the elevators are again in operation.

The following report covers World Trade Center construction activity through Friday, August 22, 1969.

Structural Steel Erection

Erection of structural steel for the North Tower Building by the contractor, Karl Koch Erecting Company, Inc., is completed to the 27th floor. The floor trusses up to the 27th floor are all in place and one-third of the exterior wall panels extend to the 29th floor.

Erection of steel for the plaza structure now extends from the North Tower Building north to Vesey Street and eastward to the building's east face. Plaza steel erection to the east of the North



PAPhoto 9242-69

This aerial view of the World Trade Center, looking south, shows the Hudson River waterfront to the Battery which will be filled in and developed with apartment and office buildings and recreational areas.

PAPhoto 924469

Looking east into the World Trade Center, this view shows progress at the entire site including the keystone area.

Tower Building has also continued and a connection has been erected to the South Tower Building.

The erection of the core columns for the South Tower Building is complete to the 5th floor. Approximately 90 per cent of the exterior wall columns have been erected to the 5th floor. Interconnecting steel is being installed between the exterior and core columns.

Perimeter Wall

The contractor, ICANDA, Ltd., continues the preparation of floor slab keys (which will eventually hold the below-grade floor slabs on the perimeter wall), the removing of irregularities from the face of the walls, and the repairing of leaks, as they occur.

Foundations

West Street Associates continues to excavate earth and rock within the perimeter wall and is approximately 99 per cent complete. To date, 1,141,000 cubic yards of earth and 120,800 cubic yards of rock have been removed.

Within the excavation the contractor has concreted approximately 99 per cent of the footings for the plaza structure. Also, portions of a retaining wall which will run along the relocated PATH tracks have been concreted.

Work has continued on the Barclay Street Truck Ramp. The structural concrete slab and curbing are complete and the wearing surface concreting operation has begun.

Concrete

The contractor, Dic-Underhill, continues operations in the North Tower Building and plaza areas. Within the North Tower Building, the contractor has concreted up to the 18th floor and the 2nd floor balcony overlooking the concourse.

Concreting operations for the plaza structure slabs continue to the west and north of the North Tower. Construction of individual

buttresses has been discontinued and the concrete contractor is now placing a continuous buttress along the base of the "slurry" wall to prevent movement of the wall after abandonment of the tieback tendons.

Plumbing

The plumbing contractor, Jarcho Brothers, Inc., is installing sleeves and inserts following deck placement. Installation of risers, standpipes and horizontal piping has continued. The fire standpipe system is now operational to the 15th floor.

In the below-grade areas, the contractor continues to install piping and drainage systems.

Electrical

Within the North Tower Building, the contractor, Nager Electric Company, has continued to install conduit and outlet boxes where concrete slabs are to be poured. Risers, conduits, outlet boxes and header ducts have been installed to the 20th floor in the elevator core area and a 120-volt supply line is available where feeders are being installed to provide power for temporary lighting and small tools for construction up to the 20th floor.

The contractor continues to install outlet boxes, sleeves and conduits as required in the plaza structure to the north of the North Tower Building.

Two permanent switchboards have been installed on the floor below the plaza in the North Tower Building and one temporary switchboard is energized in the South Tower Building. Sixteen feeders are presently being installed to bring power from the West Street Con Edison vault.

Greenwich Street Pedestrian Underpass

The contractor, Conduit and Foundation Corporation, has continued construction of the underpass which will provide access for pedestrians from Church Street and the Trade Center Concourse to

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New York's Biggest Game

World Trade Center's Construction Chief Wrestles to Keep Huge Project on Target

By WILLIAM E. BURROWS
Staff Reporter of THE WALL STREET JOURNAL

NEW YORK — Ray Monti is playing the most complicated think game in town.

He's being given $600 million worth of steel, concrete, plate glass, aluminum, woodwork, electrical fixtures and wiring, heating and air-conditioning systems, pipes, flooring, elevators, welding material, assorted nuts and bolts and other construction items.

The object of the game is to use a 100-man engineering staff and a computer to arrange all those pieces so they form the largest office-building complex in the world. Obstacles, such as strikes, parts shortages, transportation problems, accidents, and adverse weather must be overcome. All the pieces have to be put together within seven years or there are harsh financial penalties, for those putting up the complex and for New York. The name of the game is Build the World Trade Center.

About 700 tenants, who will use 90% of the available space in the Trade Center, already have signed leases. The first of them will begin moving into the North Tower in the fall of next year and the entire complex should be ready for occupancy by June 1973.

Monti is the construction manager for the Port of New York Authority's World Trade Center which, when completed, will have six buildings holding 10 million square feet of rentable space on 16 acres in lower Manhattan. Work began Sept. 1, 1966. Two of the buildings, twin 110-story, 1,350-foot towers, will be the tallest in the world.

Putting it all together is a monstrous logistical problem. Mr. Monti directs construction from the top of an industrial pyramid comprising hundreds of contractors and subcontractors, thousands of workmen, and millions of parts that must be perfectly meshed. A stoppage anywhere, even a small one, can ripple and stop work everywhere.

"It's Like the D-Day Invasion"

"It's like the D-Day invasion in terms of the intricacy of planning and coordination," says Mr. Monti, who served 20 years in the Navy's Construction Battalions, or Seabees. If he wore campaign ribbons for Port Authority projects, they would represent work on Kennedy International Airport, New York's central bus terminal, several piers, and the Heliport and Exhibit Building at the 1964-65 New York World's Fair.

"Myself and five other guys managed the World's Fair building and knew every nut and bolt in the place. That was a nice, simple, $5 million project," he recalls with some nostalgia. The cost of putting up the World Trade Center will come to at least twice that in each of the busiest months, he adds, "and that's a lot of money. A seemingly insignificant decision on any item this time gets multiplied by 220 floors."

The size of the World Trade Center and the mountains of materials going into it have prompted descriptions such as these: Its 3,000 miles of wiring and 10,000 lighting fixtures could illuminate a highway from New York to San Francisco; 16 football games could be played simultaneously in its excavation; its twin towers will be 330½ feet taller than the Queen Mary upended; its air-conditioning equipment could cool 15,000 homes and its use of electricity will be equal to that of Schenectady, N.Y. It will surpass the Pentagon as the world's largest office building.

Further, it will have 42,000 doorknobs, 21,800 windows, 200,000 pieces of steel, 250,000 square feet of marble and travertine, and 170 miles of connecting pipe in its foundation. (That connecting pipe, if laid in a straight line, would stretch all the way from Knoxville, Tenn. to Daniel Boone's grave at Baghdad, Ky.)

The time required to make all that material and get it to the construction site, in addition to its cost and the time and cost of arranging it into buildings, has been programed by the Critical Path Method of job scheduling. This is a kind of highly detailed, master plan that breaks down a seven-year battle into daily, simultaneous skirmishes.

The method, used in simplified form in 1961 to plan the Heliport and Exhibit building, is applied to the Trade Center like this:

The Port Authority and each contractor agreed long before construction began on how much of every item was to be produced. Exact delivery schedules also were agreed upon, with payments made after each delivery, rather than on completion of contracts. "That helps keep things coming on schedule," says Mr. Monti.

All that information then was fed into the computer several times, as was precise data on a delivery sequence that showed which materials had to be delivered before other materials could be used.

A refined, tightly integrated network, looking something like a complicated electrical diagram, then could be laid out on large sheets of paper. The overall Trade Center network diagram is, itself, composed of sub-networks for steel, aluminum paneling, plumbing fixtures, elevators, and so forth.

By glancing at his network diagram, Mr. Monti can see exacly how a shortage of any item affects installation of other items in terms of time and cost. If "the steel is not up, it delays laying the concrete floors, which follows 10 stories behind the steel, and both affect the wall men, ceiling men, floor-tile men, plumbers, electricians, sheet-metal men, and the rest," he explains.

The network diagram allows Mr. Monti to use contingency plans when a stoppage threatens construction. He learned one day in June that 20 vital welding-machine parts wouldn't reach the site in time to increase the number of welders to 80 from 60, for example. Mr. Monti had the parts airfreighted to Kennedy Airport and picked up by a station wagon. The network quickly told him that having the parts shipped by air was much cheaper than doing without them even for a day, considering the other work that would stop because of their absence.

If all else fails, Mr. Monti can ask the building contractors to transfer any or all of the 1,600 construction workers at the site (there eventually will be 5,000) to a less critical job unaffected by a parts shortage.

"We're three weeks behind schedule. If it weren't for the network and contingency plans, we'd be about a year behind right now," he says. But, he adds, the network method requires good input—information—and that requires good people. "If you put garbage into it, you get garbage out of it," he says.

Military-Style Organization

Mr. Monti's 100 or so engineers are part of the "people" he means. They're divided into an organizational pyramid that's organized, by his description, in military fashion.

His office is the "headquarters company," and it includes a "war room", which adjoins other offices and holds charts and graphs, a conference table, and daily reports by construction engineers. This "headquarters company" controls scheduling and costs and sets policy for the line resident engineers ("line commanders"). There are four "line commanders" to manage the two towers, the 70-foot deep excavation, or "bathtub", the Federal Customs building, and the rest of the Trade Center buildings.

Then there are 15 engineers responsible for materials inspection and logistics. They travel to contractors' plants around the country to make sure items are being made to specifications and on time. There are 15 steel fabricators (including one in Los Angeles and another in Seattle), for example, producing pieces weighing as much as 57 tons and as long as 55 feet. Yet the tolerance for everyone's steel is one-eighth of an inch. Mr. Monti is haunted by the thought of steel members arriving at the site and then not fitting together.

Other engineers are working on specific construction problems and are monitoring and updating the critical Path Method network. A separate six-man group is responsible for safety. One demolition man was killed during the excavation work, the only fatality so far.

William C. Borland, high on the pyramid, is the engineer in charge of the engineers who do in-plant inspection. He also is responsible for the shipment of materials to the site, the most difficult part of his job.

"The worst problem is trying to put up a building complex this size in one of the most congested parts of the city. If you were doing it in the Sahara Desert, you could set up 500 acres nearby for an assembly and storage area," says Mr. Borland.

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